MULTIMEDIA UNIVERSITY

STUDENT ID NO

SEAT NO

VENUE: _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

PMT0201 – MATHEMATICS II

(All sections/ Groups)

2 MARCH 2018
3.00 p.m. – 5.00 p.m.
(2 Hours)

Question	Marks
1	/10
2	/10
3	/10
4	/10
5	/10
Total	/50

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **TEN** printed pages excluding cover page.
2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the **QUESTION BOOKLET**. All necessary working steps **MUST** be shown.

Question 1

a) Find the exact value of $\sin\left(\cos^{-1}\left(\frac{3}{5}\right)+\tan^{-1}\left(-\frac{2}{3}\right)\right)$. (3.5 marks)

b) The triangle PQR has lengths $PQ = 8$ cm, $PR = 6$ cm, and $QR = 5$ cm.

i) Find the angle of PRQ of the triangle. (1.5 marks)

ii) Based on part (bi), find the area of the triangle. (1 mark)

c) Solve the equation $2\sin^2\theta + \cos ec^2\theta = 3$ for $0° \le \theta \le 360°$. (4 marks)

Question 2

a) Given that $f(x)=2\sin\left(\frac{x}{2}+\frac{\pi}{2}\right)+1$.

i) Determine the amplitude, period, phase shift and vertical shift of $f(x)$. (2 marks)

ii) Sketch one complete period of the function $f(x)=2\sin\left(\frac{x}{2}+\frac{\pi}{2}\right)+1$ for $0\le x\le 4\pi$.

(3 marks)

b) Given $w = 2(\cos 150° + i \sin 150°)$ and $z = -2\sqrt{3} - 2i$.

i) Find the polar form of z.

(2.5 marks)

ii) Use De Moivre's Theorem to find w^3. Leave the answer in the polar form with $r > 0$ and $0° \le \theta \le 360°$.

(1 mark)

iii) Based on part (bii), find the polar form of $\frac{w^3}{z}$. Leave the answer in the polar form with $r > 0$ and $0° \le \theta \le 360°$.

(1.5 marks)

Question 3

a) Compute the following limits.

i) $\lim_{x\to\infty}\sqrt{\frac{2x^4-7x^2-6x}{8x^4+3x}}$ (3 marks)

ii) $\lim_{x\to 3}\frac{\sqrt{x+6}-x}{x^3-3x^2}$ (3 marks)

b) Suppose that $f(x)=\begin{cases}\dfrac{1}{5}-\dfrac{3(\cos x-1)}{x} & \text{if } x>0\\ 2-5\sqrt{x} & \text{if } x=0\\ \dfrac{\sin x}{5x} & \text{if } x<0\end{cases}$

Is $f(x)$ continuous at $x=0$? Explain your answer by using ALL the three conditions of continuity test.

(4 marks)

Question 4

a) Find the derivative for the functions below. Show proper steps and simplify your answer.

i) $y = \sin\left(\ln\left(5x^3\right)\right)$. (Note: Use chain rule) (3 marks)

ii) $y = \dfrac{2x + \sin x}{\cos x}$ (Note: Use quotient rule) (3 marks)

Continued...

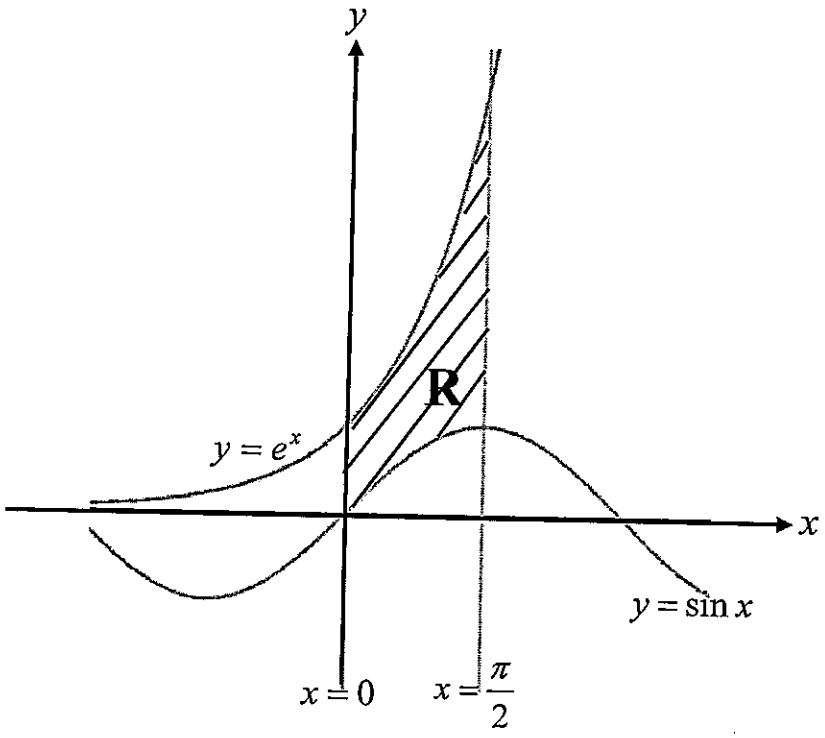
b) Find the absolute maximum and absolute minimum values of the function $f(x) = x^4 - 8x^3 - 10$ on the given interval $-1 \leq x \leq 7$. (4 marks)

Question 5

a) Find the definite integral $\int_{\sqrt{\pi/2}}^{\sqrt{2\pi}} x\cos\left(x^2\right)dx$ using integration by substitution. (3.5 marks)

b) Find the indefinite integral $\int \frac{\ln x}{x^2}dx$ using integration by parts. (3.5 marks)

c) Let R in the diagram below be the region bounded by $y = \sin x$, $y = e^x$, $x = 0$ and $x = \frac{\pi}{2}$.



Find the area of the region R. Leave your answer in exact value. (3 marks)

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